CBCS SCHEME

USN | | | | | | | | | | |

15CS73

# Seventh Semester B.E. Degree Examination, Feb./Mar.2022
# Machine Learning

Time: 3 hrs. Max. Marks: 80

***Note: Answer any FIVE full questions, choosing ONE full question from each module.***



## Module-1

1 a. What is machine learning? Explain different perspective and issues in machine learning. **(05 Marks)**

b. Define well posed learning problems with examples. **(05 Marks)**

c. Explain the final design of the checkers learning program. **(06 Marks)**

**OR**

2 a. Describe the Find S algorithm, explain its working by taking the enjoy sport concept and training instances given below:

| Example | Sky | Air Temp | Humidity | Wind | Water | Forecast | Enjoy Sport |
|---|---|---|---|---|---|---|---|
| 1 | Sunny | Warm | Normal | Strong | Warm | Same | Yes |
| 2 | Sunny | Warm | High | Strong | Warm | Same | Yes |
| 3 | Rainy | Cold | High | Strong | Warm | Change | No |
| 4 | Sunny | War | High | Strong | Cool | Change | Yes |

**(10 Marks)**

b. Explain applications of machine learning. **(06 Marks)**

## Module-2

3 a. Write $ID_3$ algorithm for decision tree learning. **(06 Marks)**

b. What is decision tree? What are the characteristics of the decision tree learning? **(06 Marks)**

c. Explain the concept of entropy and information gain. **(04 Marks)**

**OR**

4 a. What is a decision tree? Explain its representation and algorithm. **(10 Marks)**

b. Explain Inductive Bias and Issues in Decision tree. **(06 Marks)**

## Module-3

5 a. Explain appropriate problems for neural network learning with its characteristics. **(08 Marks)**

b. Explain in detail perceptron based Artificial Neural Network (ANN) system its representation and training rule. **(08 Marks)**

**OR**

6 a. Explain the single perceptron with its learning algorithm and its separability and convergence property. **(08 Marks)**

b. Explain back propagation algorithm in detail. **(08 Marks)**

## Module-4

7 a. Explain likelihood hypothesis for predicting probabilities. **(08 Marks)**

b. Explain the EM algorithm in detail. **(08 Marks)**

OR

8 a. Explain Naïve Bayes classifier in detail. (08 Marks)
b. Explain brute force Bayes concept learning. (08 Marks)

## Module-5

9 a. What is reinforcement learning? (06 Marks)
b. Explain the Q function and Q learning algorithm. (10 Marks)

OR

10 a. Explain case based reasoning. (08 Marks)
b. Write K-nearest neighbor algorithm for approximating a discrete valued function. (04 Marks)
c. Define Simple error and True error. (04 Marks)

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